LESSON MAKER PRO

Line Link Lab

Connect rates, graphs, and equations.

GRADE 8 · 8.EE.B

CCSS.Math.Content.8.EE.B "Understand the connections between proportional relationships, lines, and linear equations."

NAME _____ DATE _____

THE BIG IDEA

A proportional relationship has a constant ratio y/x and can be written as y = mx. Its graph is a line through (0,0), and m is both the unit rate and the slope. A linear equation y = mx + b is also a line, but it is proportional only when b = 0.

WORKED EXAMPLE

A proportional relationship includes the point (11, 88). Write its equation and identify its slope.

1. Find the unit rate: 88/11 = 8.
2. Use y = mx because a proportional line goes through (0,0).
3. Substitute m = 8: y = 8x.

Answer: y = 8x; slope = 8

PRACTICE 6 problems

1 The table shows x-values 2, 4, and 6 with y-values 10, 20, and 30. Is the relationship proportional? Write its equation.

ANSWER _____

2 For y = -3x, state the slope and tell whether the relationship is proportional.

ANSWER _____

3 For y = 4x + 9, state the slope, the y-intercept, and whether the relationship is proportional.

ANSWER _____

4 A line passes through (0,0) and (5,-15). Write its equation.

ANSWER _____

5 The table has points (1,6), (2,12), and (3,19). Is the relationship proportional? Explain using ratios.

ANSWER _____

6 Compare y = 2x and y = 2x + 5. Do they have the same slope? Are they both proportional?

ANSWER _____

APPLY IT Show your work

1 A music app has two plans. Plan A costs $5 per month plus a one-time $12 setup fee. Plan B costs $7 per month with no setup fee. Let x be the number of months and y be the total cost. Write an equation for each plan. After how many months do the plans cost the same amount?

WORK SPACE

ANSWER _____

2 At a school esports event, volunteers earn 14 prize tokens for 2 hours of work. The number of tokens is proportional to the number of hours. Let x be hours and y be tokens. Write an equation and find the number of tokens earned after 9 hours.

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

Line A has equation y = -2x + 6. Line B passes through (0,6) and (3,0). Are the two lines the same line? Explain your reasoning.

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_____

ANSWER KEY

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	The table shows x-values 2, 4, and 6 with y-values 10, 20, and 30. Is the relationship proportional? Write its equation.	**Yes; y = 5x.**
2	For y = -3x, state the slope and tell whether the relationship is proportional.	**Slope = -3; yes, it is proportional.**
3	For y = 4x + 9, state the slope, the y-intercept, and whether the relationship is proportional.	**Slope = 4; y-intercept = 9; it is not proportional.**
4	A line passes through (0,0) and (5,-15). Write its equation.	**y = -3x**
5	The table has points (1,6), (2,12), and (3,19). Is the relationship proportional? Explain using ratios.	**No; 6/1 = 6 and 12/2 = 6, but 19/3 is not 6.**
6	Compare y = 2x and y = 2x + 5. Do they have the same slope? Are they both proportional?	**They have the same slope, 2. Only y = 2x is proportional.**

PART 2 · APPLY IT

1. **Plan A: y = 5x + 12. Plan B: y = 7x. They cost the same after 6 months, when each costs $42.** Set the total costs equal: 5x + 12 = 7x. This gives x = 6, and substituting gives a total cost of $42.
2. **y = 7x; 63 tokens** The unit rate is 14/2 = 7 tokens per hour, so y = 7x. Substitute x = 9 to get y = 63.

CHALLENGE

Yes. The slope of Line B is (0 - 6)/(3 - 0) = -2, and its y-intercept is 6, so both lines have equation y = -2x + 6.

Accept equivalent equation forms, such as 3x + y = 0 for y = -3x. For proportionality explanations, require evidence of a constant ratio or a y-intercept of 0.